PATENT
Attorney Docket No.: 16869P-083400US
Client Ref. No.: 340201750US1
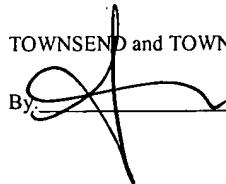
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation Number.: 8562
Soichi Sakurai	Examiner: Unassigned
Application No.: 10/603,076	Technology Center/Art Unit: 2186
Filed: June 23, 2003	PETITION TO MAKE SPECIAL FOR NEW APPLICATION UNDER M.P.E.P. § 708.02, VIII
For: DATA PROCESSING SYSTEM INCLUDING STORAGE SYSTEMS	
Customer No.: 20350	

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

       This is a petition to make special the above-identified application under MPEP § 708.02, VIII. The application has not received any examination by the Examiner.

       (a)   The Commissioner is authorized to charge the petition fee of $130 under 37 C.F.R. § 1.17(i) and any other fees associated with this paper to Deposit Account 20-1430.

10/13/2004 HALI11   00000039 201430   10603076
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(b)   All the claims are believed to be directed to a single invention. If the Office determines that all the claims presented are not obviously directed to a single invention, then Applicant will make an election without traverse as a prerequisite to the grant of special status. If claims 13-16 (method claims) are found not to be examinable with the group including claims 1-12 and 18-20 (apparatus claims), then Applicant hereby cancels claims 13-16 and elects claims 1-12 and 18-20 and any other claims in the same group. Similarly, if claim 17 (computer medium claims) is found not to be examinable with the group including claims 1-12 and 18-20, then Applicant hereby cancels claim 17 and elects claims 1-12 and 18-20 and any other claims in the same group.

(c)   Pre-examination searches were made covering Subclasses 6, 11, 13, and 19 of Class 714; Subclasses 113, 114, 162, and 164 of Class 711; Subclass 21 of Class 710; and Subclasses 8, 10, and 201-206 of Class 707, by Mattingly, Stanger & Malur, P.C. ("Mattingly"), a professional search firm. The U.S. Patent and U.S. Patent Publication databases were searched using keywords. Copies of the letter and search report received from the Mattingly are enclosed.

(d)   The following U.S. patents and applications, accordingly to Mattingly, have been deemed most closely related to the subject matter encompassed by the claims:

     (1)   U.S. Patent No. 6,549,920 to Obara

     (2)   U.S. Patent No. 6,560,617 to Winger

     (3)   U.S. Patent No. 6,526,487 to Ohran

     (4)   U.S. Patent No. 6,338,126 to Ohran

     (5)   U.S. Patent No. 6.044,444 to Ofek

     (6)   U.S. Patent No. 5,901,327 to Ofek

     (7)   U.S. Patent No. 5,742,792 to Yanai

     (8)   U.S. Patent App. Pub. No.2003/0115224 to Obrara

     (9)   U.S. Patent App. Pub. No. 2002/0133511 to Hostetter

(e)   Set forth below is a detailed discussion of references which points out with particularly how the claimed subject matter is distinguishable over the references.

Claimed Embodiments of the Present Invention.

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The claimed embodiments relates to a data processing system for providing redundant data. The embodiments use at least two communication links between two storage system: a first link to communicate primarily management information between hosts and a second link to transmit primarily data between storage subsystems. Redundant data are efficiently provided at the secondary storage subsystem by having the first and second hosts and the first and second subsystems cooperate with each other.

Claim 1 recites, "a first storage system including a first host and a first storage subsystem, the first host having access to a first copy manager, the first copy manager being operable to manage a data replication operation; a second storage system including a second host and a second storage subsystem, the second host having access to a second copy manager, the second copy manager being operable to manage a data replication operation; a first communication link coupling the first storage system and the second storage system to exchange management information between the first and second storage systems to manage the data replication operation, the management information including first control information transmitted from the first host to the second host; and a data transfer path configured to transfer data stored in the first storage subsystem to the second storage subsystem and replicate the data of the first storage subsystem in the second storage subsystem, the data transfer path being different from the first communication link, wherein the second host is configured to cause execution of the second copy manager using the first control information to initiate transfer of the data from the first storage subsystem to the second storage subsystem."

Claim 13 recites, "transmitting a completion notification from the second storage subsystem to the second host to inform the second host that the second storage subsystem has finished receiving first information from the first storage subsystem via a data transfer link coupling the first and second storage subsystems; receiving at the second storage subsystem a restore command from the second host to obtain second information using the first information, the second information being associated with the first information; and performing a restoration process to obtain the second information at the second storage subsystem upon receiving the restore command, the second information being a copy of data stored in the first storage subsystem, wherein the first and second hosts are coupled to each other via a communication link

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to transmit or receive management information relating to the remote replication method." A system or method having the above recited features may be used to provide one or more of the benefits explained below.

One benefit that may be derived is the improvement in providing redundant data at a remote storage system. The delay as a result of bottleneck is reduced by providing two different communication links: one to communicate management information between first and second hosts and another to transfer data between first and second storage subsystems (see the first and second paragraphs of page 3).

Another benefit that may be derived is the use of a second storage area (e.g., a journal volume 2222 to store journals therein), so that a first a primary storage area (e.g., a volume 2212) may store write data received from the first host with minimal performance impact. Fig. 3 illustrates this concept according to an embodiment of the invention.

U.S. Patent No. 6,549,920 to Obara

Obara discloses a data duplication control method for a Database Management System (DBMS) in a storage system. An agent directs the DBMS of a main host system to overwrite data of the database table. The agent directs a main disk control unit of the main disk unit to transfer the DB table data in the DB table to a DB table on a subordinate disk unit by way of a subordinate disk control unit in order to duplicate the DB table data.

Regarding claim 1, Obara does not disclose both "the first communication link" and "the data transfer path." Obara also does not disclose the second host that is configured "to cause execution of the second copy manager using the first control information to initiate transfer of the data from the first storage subsystem to the second storage subsystem."

Regarding claim 13, Obara does not disclose the concept of restoration process, where the second information is obtained using the first information. For example, the data that had been stored in the first storage area or primary volume is obtained by restoring the journal, so that a copy of the data may be stored in a secondary volume (see Fig. 7).

U.S. Patent No. 6,560,617 to Winger

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Winger discloses a method for providing rapid recovery from a network file server failure through the use of a backup computer system or server. The backup computer system runs a special mass storage access program that communicates with a mass storage emulator program on the network file server, making the disks or other mass storage devices on the backup computer system appear like they were disks on the file server computer. Data on the file server is copied to the back-up server by writing to the mass storage of the backup computer using a mass storage emulator. The mass storage devices 114 and 124 appear to be disk drives. (col. 3:21-23).

Regarding claim 1, Winger does not disclose the first and second storage subsystems. Accordingly, winger does not disclose "the first communication link" coupling the storage subsystems. Communication means 102 in Winger couples the two computer systems. The mass storage devices do not communicate or transfer data directly with each other since there is no "data transfer path" that couples them. In addition, Winger does not disclose the second host that is configured "to cause execution of the second copy manager using the first control information to initiate transfer of the data from the first storage subsystem to the second storage subsystem."

Regarding claim 13, Winger does not disclose the concept of restoration process, where the second information is obtained using the first information.

U.S. Patent No. 6,526,487 to Ohran

Ohran discloses a primary computer system and a backup computer system to copy data of the primary system to the backup system. Ohran discloses a method of obtaining mirrored data so that the original data can be recovered after failure without transmitting the entire mirrored data between the computers. A write request at a primary computer is stored in a delay buffer and a copy is transmitted to a backup computer, where it is stored in a delta queue. The backup computer executes the copy of the write request to the mirrored data and transmits an acknowledgement to the primary computer that the copy of the write request has been received. In response to the acknowledgement, the primary computer executes the write request stored in the delay buffer. The computers send to each other subsequent acknowledgements of

the write request execution, enabling the computers to delete the write requests. If the primary computer fails, the primary computer can recover the original data by receiving only the copies of write requests that remain stored in the delta queue.

Regarding claim 1, Ohran does not disclose the first and second subsystems. Accordingly, it does not disclose both "the first communication link" and "the data transfer path." Ohran also does not disclose the second host that is configured "to cause execution of the second copy manager using the first control information to initiate transfer of the data from the first storage subsystem to the second storage subsystem."

Regarding claim 13, Ohran does not disclose the concept of restoration process, where the second information is obtained using the first information.

U.S. Patent No. 6,338,126 to Ohran

Ohran discloses a primary computer system and a backup computer system, each having an associated memory. For each write request, a copy of the request is forwarded to a delay buffer and memory queue associated with the primary computer system, and a copy is forwarded to a memory queue of the backup computer system. The backup computer system transmits an acknowledgement signal to the primary computer system when the backup computer system receives its copy of the request. The write request in the delay buffer of the primary computer system is executed in the primary memory only upon receipt of this acknowledgement signal. Thus, the backup computer system knows of every request executed in the primary memory. The write request is executed in the backup memory at any time after the backup computer system receives the write request. The write requests are deleted from the memory queues (primary and backup) when the associated computer system confirms that the write request was executed in the memory of the opposite computer system. Should the primary (or backup) computer system shut down, the requests are accumulated in the opposite backup (or primary) memory queue. When the primary (or backup) computer system becomes operational again, the requests in the opposite backup (or primary) memory queue are executed in the primary (or backup) memory. Thus, no memory is lost when the primary (or backup) computer system shuts down and complete remirroring of data is not required.

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Regarding claim 1, Ohran does not disclose the hosts and subsystems, in the manner recited. The mass storage devices 114 and 124 appear to be magnetic disks (col.4:1-2). Accordingly, Ohran does not disclose "the data transfer path" coupling the storage subsystems. Obara also does not disclose the second host that is configured "to cause execution of the second copy manager using the first control information to initiate transfer of the data from the first storage subsystem to the second storage subsystem."

Regarding claim 13, Ohran does not disclose the concept of restoration process, where the second information is obtained using the first information.

U.S. Patent No. 6,044,444 to Ofek

Ofek discloses two data storage systems that are interconnected by a data link for remote mirroring of data. Each volume of data is configured as local, primary in a remotely mirrored volume pair, or secondary in a remotely mirrored volume pair. A host computer directly accesses either a local or a primary volume, and data written to a primary volume is automatically sent over the link to a corresponding secondary volume. Each remotely mirrored volume pair can operate in a selected synchronization mode including synchronous, semi-synchronous, adaptive copy--remote write pending, and adaptive copy--disk.

Regarding claim 1, Ofek does not disclose both the "first communication link" and "the data transfer path." In Ofek, each host is configured to access and communicate with the two disk array units 214 and 246 (see Fig. 4). That is, Ofek does not disclose a first communication link that is used to exchange management information to manage the data replication operation, where the management information includes first control information transmitted from the first host to the second host. Ofek also does not disclose the second host that is configured "to cause execution of the second copy manager using the first control information to initiate transfer of the data from the first storage subsystem to the second storage subsystem."

Regarding claim 13, Ofek does not disclose the concept of restoration process, where the second information is obtained using the first information.

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U.S. Patent No. 5,901,327 to Ofek

This patent is a related to Ofek above and has the same specification. As explained above, Ofek does not disclose both the "first communication link" and "the data transfer path." In Ofek, each host is configured to access and communicate with the two disk array units 214 and 246 (see Fig. 4). That is, Ofek does not disclose a first communication link that is used to exchange management information to manage the data replication operation, where the management information includes first control information transmitted from the first host to the second host. Ofek also does not disclose the second host that is configured "to cause execution of the second copy manager using the first control information to initiate transfer of the data from the first storage subsystem to the second storage subsystem." Ofek does not disclose the concept of restoration process, where the second information is obtained using the first information.

U.S. Patent No. 5,742,792 to Yanai

Yanai discloses two data storage systems that are interconnected by a data link for remote mirroring of data. Yanai is related to Ofek above and has the same specification . As explained above, Ofek does not disclose both the "first communication link" and "the data transfer path." In Ofek, each host is configured to access and communicate with the two disk array units 214 and 246 (see Fig. 4). That is, Ofek does not disclose a first communication link that is used to exchange management information to manage the data replication operation, where the management information includes first control information transmitted from the first host to the second host. Ofek also does not disclose the second host that is configured "to cause execution of the second copy manager using the first control information to initiate transfer of the data from the first storage subsystem to the second storage subsystem." Yanai does not disclose the concept of restoration process, where the second information is obtained using the first information.

U.S. Patent App. Pub. No.2003/0115224 to Obrara

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Obara discloses a database duplication method. An agent directs the Database Management System of a main host system to overwrite data of the database table. The agent directs a main disk control unit of the main disk unit to transfer the DB table data in the DB table to a DB table on a subordinate disk unit by way of a subordinate disk control unit in order to duplicate the DB table data. Obara does not disclose "the first communication link" and "the data transfer path." Obara also does not disclose the second host that is configured "to cause execution of the second copy manager using the first control information to initiate transfer of the data from the first storage subsystem to the second storage subsystem." Obara does not disclose the concept of restoration process, where the second information is obtained using the first information.

U.S. Patent App. Pub. No. 2002/0133511 to Hostetter

Hostetter discloses a system and method for synchronizing a data copy that include a source volume having a data file stored thereon. The source volume is configured to receive write commands from a host. The method includes executing the write commands to generate an updated data file and generating a record of the write commands. The system and method further include a secondary volume having a copy of the data file stored thereon. The secondary volume is configured to receive and store data indicated by the write command record.

Regarding claim 1, Hostetter does not disclose the "first communication link" that is used to exchange management information to manage the data replication operation, where the management information includes first control information transmitted from the first host to the second host. In fact, Hostetter only discloses one host. Hostetter also does not disclose the second host that is configured "to cause execution of the second copy manager using the first control information to initiate transfer of the data from the first storage subsystem to the second storage subsystem."

Regarding claim 13, Hostetter does not disclose the concept of restoration process, where the second information is obtained using the first information.

In view of this petition, the Examiner is respectfully requested to issue a first Office Action at an early date.

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Respectfully submitted,

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PATENT, TRADEMARK
AND COPYRIGHT LAW

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COPY

February 5, 2004

Re: Search for Petition to Make Special
      U.S. Appln. No.10/603076
      Your: **340201750US01**
      Our: HIT 0401-009

Junichi Kishida, Manager
Patent Department 2
Hitachi, Ltd. Intellectual Property Department
292, Yoshida-cho, Totsuka-ku, Yokohama-shi
Kanagawa 244-0817, Japan

Dear Mr. Kishida:

Please find attached our search report for the above-reference U.S. application. We have included a CD-ROM disk containing copies of our findings in Adobe PDF form.

Since this is one of our first reports for this type of search, we would be happy to receive any comments regarding the format of the report and the usefulness of our comments. If you prefer to see changes made to future search reports, please let us know.

Should you have any questions, please contact us.

Best regards,

David W. Tucker

U.S. Application 10/603076 Patentability Search Report   **Confidential**

Subject of our Search

Our search was conducted to find prior art for Claims 1-20 of U.S. Application 10/603076. The claims concern data replication between a first and second storage system. As a representative example (e.g. Claim 1), a first storage system includes a first host and a first storage subsystem, the host having access to a first copy manager. A second storage system includes a second host having access to a second copy manager. Both copy managers are operable to manage data replication. A first communication link couples the first and second storage systems to exchange management information. A second data transfer path is used to transfer data stored in the first storage subsystem to the second storage subsystem, the transfer path being different than the first communication link. Some claims include the transfer of stored journal information from the first system to the second. The key point in the independent claims includes the use to two separate communication means between storage systems. The second path can be a high bandwidth means for the transfer of large amounts of data, leaving the management information transfer to another path.

Field of Search

Class	Subclasses
714	6, 11, 13, 19
711	113, 114, 162, 164
710	21
707	8, 10, 201, 202, 203, 204, 205, 206

Our search included broad keyword searches of the U.S. Patents and U.S. Patent Publications databases.

Results of our Search

<u>U.S. Patents</u>

6,549,920	Obara
6,560,617	Winger
6,526,487	Ohran
6,338,126	Ohran
6,044,444	Ofek
5,901,327	Ofek
5,742,792	Yanai

<u>U.S. Patent Application Publications</u>

2003/0115224   Obara
2002/0133511   Hostetter

Discussion

Patent application publication **2003/0115224 (Obara)** and related U.S. Patent **6,549,920 (Obara)** discloses a database duplication system including a first storage system 9 (main disk unit) and a second storage system 10 (subordinate disk unit). The first system has a host 1a and a disk controller 7a, the second system having a host 1b and a disk controller 7b. Both hosts and their disk controllers are interconnected by a LAN network 19 and the disk controllers are further interconnected by a high-speed channel connection 8 for the transfer of large amounts of data. In a non-synchronous mode, the first system stores write commands in a local buffer as a DB TABLE, and the controller periodically transfers the DB TABLE to the second storage system (see paragraph 0067).

U.S. Patent **6,560,617 (Winger)** discloses a first database server connected to a second database server by a networked link 101 and also by a high bandwidth channel link 102. Hosts can be connected to the servers via the network connection 101. Mass transfers of data between systems is made using channel link 102. Data modification requests stored at the first system is sent to the second system for use in making changes to its local store. U.S. Patents **6,526,487 (Ohran)** and **6,338,126 (Ohran)** have the same assignee and provide similar disclosures.

U.S. Patent **6,044,444 (Ofek)** discloses a first data storage system interconnected with a second data storage system by plural links. Noting Figure 1, link 63 is a signal link between controllers and link 40 is a high bandwidth link between controllers for the transfer of large amounts of data. An asynchronous transfer mode of operation is described beginning at column 9, lines 42+. The high-speed link is described in column 8, lines 25+. U.S. Patents **5,901,327 (Ofek)** and **5,742,792 (Yanai)** have the same assignee and provide similar disclosures.

Patent application publication **2002/0133511 (Hostetter)** discloses the prior method of providing a single transfer communications means 36 between a first storage system and a second storage system for replication purposes. A host is connected to the first system with a separate connection (see paragraph 0021). The first system stores a journal that is sent to the second system.

FEE TRANSMITTAL
for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT | ($) 130

Complete if Known	
Application Number	10/603,076
Filing Date	June 23, 2003
First Named Inventor	Takeda, Takahiko
Examiner Name	M. Padmanabhan
Art Unit	2188
Attorney Docket No.	16869P-083400US

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& TRADEMARK OFFICE

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit Card ☐ Money Order ☐ Other ☐ None
☒ Deposit Account:

Deposit Account Number: **20-1430**

Deposit Account Name: **Townsend and Townsend and Crew LLP**

The Director is authorized to: *(check all that apply)*
☒ Charge fee(s) indicated below ☒ Credit any overpayments
☒ Charge any additional fee(s) or any underpayment of fee(s)
☐ Charge fee(s) indicated below, **except for the filing fee**
to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity		Small Entity			
Fee Code	Fee ($)	Fee Code	Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims	Fee from below	Fee Paid
Total Claims	-** =	X =	
Independent Claims	-** =	X =	
Multiple Dependent		X =	

Large Entity		Small Entity		
Fee Code	Fee ($)	Fee Code	Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)

*or number previously paid, if greater; For Reissues, see above
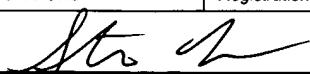
FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity		Small Entity			
Fee Code	Fee ($)	Fee Code	Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive – unavoidable	
1453	1,330	2453	665	Petition to revive – unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	130
1807	50	1807	50	Petitions related to provisional applications	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) --

*Reduced by Basic Filing Fee Paid **SUBTOTAL (3)** ($)130

SUBMITTED BY

Complete *(if applicable)*

Name (Print/Type)	Steve Y. Cho	Registration No. (Attorney/Agent)	44,612	Telephone	650-326-2400
Signature				Date	10/8/04

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